Double stock versus racks
– what's what?

Generate significant economic and environmental value through capacity optimisation

Every day, we meet with logistics professionals and discuss how they handle and optimise the growing amount of pallet freight they're asked to transport during a time of increasing climate regulations and scarce capacity. Almost all of them are looking for solutions and concrete optimisation tools that will accommodate these aforementioned challenges. It's here that pallet racks and double stock are mentioned as solutions, and we're often asked: Why should we use SpaceInvader's pallet racks when we can go with double stock, a tool already in use and known to many? It's a great question that we like to provide a nuanced answer to. We don't believe there's a simple yes-or-no answer when double stock is better than racks or vice-versa in terms of optimising your capacity. Confused? Let's take a closer look at the two different solutions, while keeping in mind the two solutions can compliment each other for maximum operational payoff.

A focus on capacity optimisation

Both double stock and pallet racks can be used to optimise capacity – essentially getting more goods on fewer trucks. Optimisation of freight and maximum utilisation of available space in trucks has become more relevant and necessary than ever before. Transitioning the transportation sector is a particularly great challenge, because it's an industry that emits far more emissions than our planet can sustain. At the same time, the area for improvement is massive, as trucks' rate of fill in the EU averages 57%. Even empty or half-empty trucks emit CO2. Heavy road transports can't ignore the necessity of capacity optimisation if Denmark is to reach its 70% emissions reduction target by 2030. Essentially, the goal is to avoid empty runs completely. That's possible if the trucks that hit the road have more inside of them. CO2 saved is CO2 earned. Fewer runs benefit our environment, both global and local, and your economic bottom line, as well as other scarcity challenges. Finally, more and more companies are now demanding climate-optimised goods and transport. Let's now go through the before-mentioned capacity-optimising solutions so we can gain a better understanding of when they're used, when they give the best return, and their respective pros and cons.

No capacity optimisation

Capacity optimisation with double stock

Capacity optimisation with racks

Double Stock

Double stock (DS) are horizontal beams that can be pulled down into the freight area on a rail mounted alongside a box trailer (trailer with fixed sides). The beams are mounted in intervals equivalent to EUR-pallets' length down the length of the trailer. Double stock makes it possible to lower two beams to the height of the desired double-stack row, whereafter an extra level of loaded pallets is placed on top of the beams and thereby increases freight capacity and packs the trailers better. The optimisation occurs solely in the cargo area of the specific available trailer. Pallet freight is therefore not optimised elsewhere in the value chain where capacity challenges may exist.

Pros

- Trailer-based capacity optimisation.
- Optimal whole-freight optimisation tool.
- Particularly well-suited for freight optimal for uniform double-stacking.
- No return costs.
- No running costs, except maintenance, repairs and replacements.

Cons

- Binding, fixed leasing costs with DS-trailers.
- Beams cannot be lowered below the highest pallet in the row (can lead to wasted space).
- More expensive leasing solution compared to trailers without double stock.
- Requires a high degree of capacity planning and manual handling of pallet heights.
- Requires a large capacity of DS-trailers to ensure necessary availability.
- If beam rails are to be repaired, the trailer must be taken out of active service.
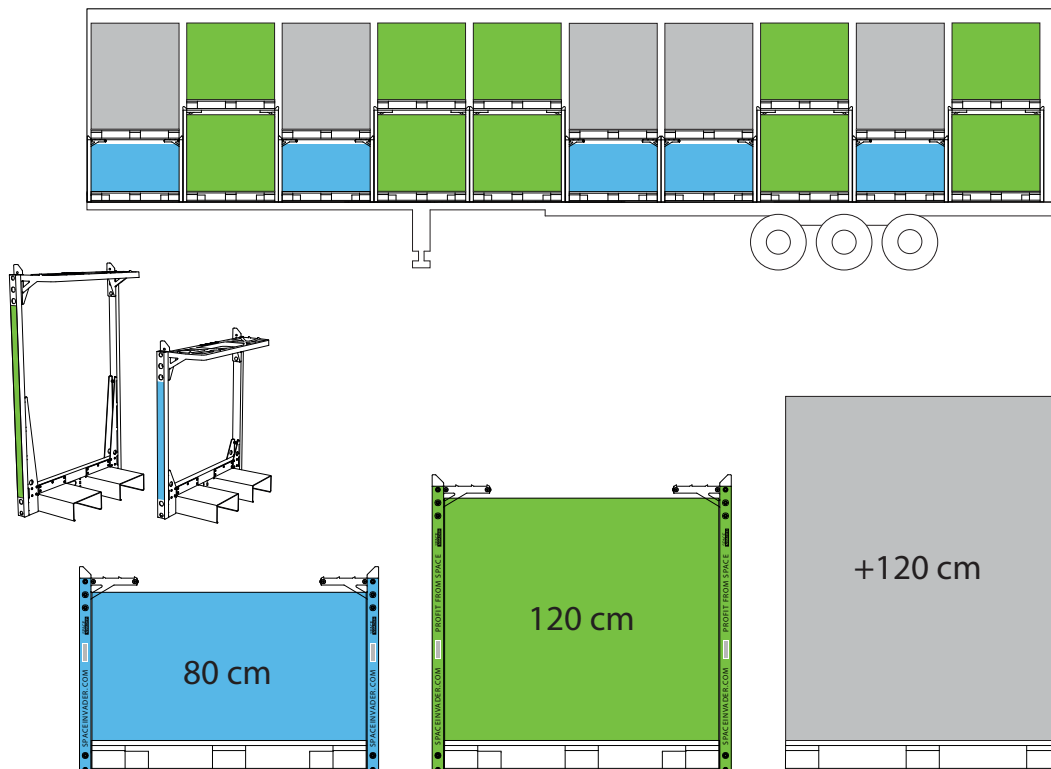- Only optimises individual trailers.

Racks

SpaceInvader racks is a pallet-based transport-optimisation system, which capacity optimises freight throughout the supply chain. The system offers safe and efficient double-stacking of pallets and consists of modular pallet racks in two standard heights (80 and 120 cm.), produced in recyclable lightweight aluminium. The solution can handle and optimise both the size and height of mixed pallet goods, down to the level of each individual pallet. SpaceInvader can be implemented on a needs-basis on all trailer types in operation and throughout the supply chain. SpaceInvader can be particularly valuable in partially loaded trailers or when a specific part of the trailer's cargo area is to be optimised.

Pros

- Pallet-based capacity optimisation (both uniform and mixed goods).
- Enables complete trailer fill rate.
- Solution can be implemented on a needs-basis – on all types of trailers and containers.
- Well-suited for transportation of part-loads, or to optimise parts of the trailer cargo area.
- Can be used in combination with double stock.
- Economic benefit compared to double stock when double-stacking up to 15 pallet places.
- Enables double-stacking of pallets otherwise necessary to transport with extra trucks (surplus pallets) and thereby does away with possible extra runs.
- Optimises freight throughout the supply chain (from production to distribution on the same pallet).
- Only OPEX cost. The system can be rented on flexible terms based on capacity needs.

Cons

- Handling is dependent on operational process.
- Return costs when return transport isn't included in standard proces.
- Racks should be controlled as assets in logistics pool for optimal utilisation.
- The solution is based on a flexible and a scaleable rental model, and requires a certain level of freight volume.

With two standard rack heights (marked with blue and green, respectively) most pallet heights can be optimised.

All pallet freight is stackable

We all know of pallet goods that normally can't be stacked. A pallet rack system can stack all kinds of goods, also uneven, fragile or hazardous goods. The pallet rack system can increase the collective height of the pallet to +240 cm. with double-stacking, which yields a great marginal gain. **Ex.:** double-stacking on 6 pallet places (12 pallets) yields an efficiency increase of 18% on the transport (6 extra pallets/33 pallet placcs = 18% direct efficiency increase)

Fewer delivery runs

Entire transports can be saved, both in the aggregate or ad hoc. Surplus pallets will often be delivered by separate extra trucks, because there wasn't quite enough space on the first truck. Surplus pallets and associated extra transports can be avoided with double-stacking. After more than two years of using SpaceInvader, PostNord Logistics' research has shown that they on average have 7.3 SpaceInvader double-stacked pallets on every transport. Taken together, it means they've effectivised the hub-hub routes where they use SpaceInvader by 22%.

Height optimisation

Pallets can be packed for transport optimisation, so you achieve full height on the individual pallet – so pallet height, for example, goes from 160 cm. to 240 cm. distributed between two double-stacked pallets. It's a direct efficiency increase of 50% – something VELUX have realised in their transportation of window frames.

Summary

As mentioned in the introduction, both solutions have their pros and cons. Generally, it can be concluded that double stock (DS) is the preferable solution (economically and efficiency-wise) if the operational setup delivers optimised full-load trailers with uniform goods. Alternatively, SpaceInvader is clearly to be preferred in the case of mixed pallet heights, or if every single pallet place should be optimised, or if only a part of the cargo area is to be optimised. This applies in a hub-hub scenario, but also if the same double-stacked pallet is to be moved through the entire supply chain, meaning from production to distribution. Even a few double-stacks, for example of surplus pallets, can do away with an entire extra transport.

Capacity optimisation at ASKO Norway (FMCG)

Capacity optimisation at VELUX (industry)

Capacity optimisation at PostNord Logistics (transportation)

Recommendations

Which solution is right for you is difficult to ascertain at first glance, and requires closer analysis. If you're curious to learn the potential of the SpaceInvader solution, we recommend an introductory conversation with one of our consultants. Together, you can choose a suitable and limited focus area which satisfies some of the criteria whereby the benefits of SpaceInvader are maximised (see overview in appendix) and has a potential for further scaling based on the learnings and results.

If the potential proves feasible, we will recommend a pilot test in your unique logistics operation. Such a pilot test would be conducted in close collaboration, typically over a period of three months. You'll thereafter have a clear picture of the value potential, both economically and in terms of climate benefits, as SpaceInvader also offers a third-party certified emission savings calculator, which documents how much CO_2 you stand to save through the use of the SpaceInvader solution.

But remember the two solutions can compliment each other for maximum operational payoff.

https://www.spaceinvader.com/en/pilot-test/

postnord

Customer insights

Post Nord Logistics uses both double stock trailers, road trains and curtain-side trailers in their operation in combination with the SpaceInvader system. Through the flexible implementation of the SpaceInvader racks, PostNord Logistics has achieved savings of 13% through the use of 2-15 sets on each trailer, depending on route, cargo type, distance and destination.

Example
Double-stacking in retail

There are a lot of gains to be made in distribution when you double-stack pallets. Gains that benefit both you and your customers. More goods on every truck makes you more competitive, improves your botttom line, the ergonomics of your goods, and makes the whole distribution chain greener. How so?

The SpaceInvader solution
SpaceInvader stacks fx. two 120 cm. pallets easily, safely and securely. You can thereby always double-stack to a height of 240 cm. or higher on every pallet place. You thereby meet the challenge of packing pallets as high as possible for transport, and altso making sure the manual handling of the goods are as ergonomic as possible for recipients, as you avoid very tall single pallets.

Packing the pallet
Lower height of packed goods on the individual pallets makes producing the pallet easier and reduces breakage. The lower pallet packaging height prevents damages to goods, because you avoid the tall, densely packed, difficult-to-handle, and unstable pallet packaging. Goods can also more easily be packed by category on the pallets if that's beneficial to the recipients.

Sender
Double-stacks are prepared before the truck arrives, and when it does, the loading is efficient, with two pallets at a time and ensuring maximum utilisation of every pallet position in the truck.

Transportation
Every transport can benefit from maximum fill rate with goods up to the ceiling on all pallet places, also fx. in longitudinally partitioned climate-controlled zones. At the same time, the goods are protected by the racks, avoiding breakage.

Unloading
Loading is similarly efficient with two pallets being loaded at a time.

Optimisation in production

Optimisation during loading/unloading

Optimisation during transportation

Recipient

The receiving location will also benefit from the double-stacks if they're looking to optimise their floor space. Alternatively, the pallets can be unstacked upon delivery and the driver returns the stacked racks immediately.

At the receiving location, the manual handling of goods are as ergonomic and easy managed as possible for employees due to optimised pallet- and working height. On delivery to stores, it's easier to unpack and distribute products and the pallets can be moved directly into stores using a pallet jack. Other stores often repack in the backstore, which is avoided using our system. The less employees need to lift and move around, the better!

Handling of the racks

Drivers or the receiving location keeps track of the racks, for handling, delivery and return flow to work optimally. Drivers decide where racks go on the truck once freight has been delivered. The racks take up a minimum of space on the return leg, as racks can be stacked compactly, up to 20 racks on one EUR-pallet when not in use and when they're to be returned.

Tracking of the racks

Every rack has a unique GS1-standard barcode, which can be modified into third-party scanning systems.

Route planning

Optimised route planning with fully loaded trucks or more drops mean the distribution operation will be able to reduce the total number of trucks and kilometers driven – benefitting the bottom line as well as the carbon footprint.

Find out what SpaceInvader can do for you

SpaceInvader has developed a pilot test, which is an isolated project we tailor to optimise the logistics flow in a dedicated focus area. During the pilot test, which typically lasts a few months, we measure the effect of the system. You get to experience the system in action, and receive quantifiable results that can be used in a business case or possibly for subsequent scaling. We support you throughout the process, so you maximise your know-how and get the greatest return during the process.

Possible optimisation at the receiving location

Ergonomic working height on goods

Efficient return of racks

Double stock versus racks

Fact sheet

Strategic preference

Type of capacity optimisation	Double stock	SpaceInvader racks
Trailer type	Box trailer	All types of trailers and containers for pallet transport *(box trailers, curtain-sided, shipping containers etc.)*
Freight optimisation in the entire supply chain	No *(trailer only)*	Yes *(goods can be double-stacked on the same pallet through the entire supply chain)*
Fixed versus flexible costs	Fixed and binding leasing agreement of double stock trailers	OPEX-based rental solution, non-binding, flexible cost
Availability	• A DS-trailer must be available for optimisation • Can be challenging to ensure availability in a large operational setup	• Can be used when and where needed • Number of racks can be scaled up or down based on need • Pool- and return management optimises value creation
Capacity utilisation	Limited by trailer	Independent of trailer/flexible
Free replacement in case of defect	No, repairs are additional costs	Yes, free replacement as part of the rental agreement if repair is needed

Economics

Type of capacity optimisation	Double stock	SpaceInvader racks
Requires investment in double stock trailers *(CAPEX)*	yes	no
Capacity needs can lead to over-investment in double stock trailers	yes	no
Cheapest when "only" optimising up to 15 pallet positions	no	yes
Cheapest when optimising entire trailer cargo	yes	no
Cheapest for ad-hoc optimisation	no	yes
Cheapest for part-load optimisation	no	yes
Flexible costs *(OPEX-based cost, fx. rental agreement)*	no	yes
Reduces need of floor space for fx. wholesale, retail clients	no	yes

Daily operations

Type of capacity optimisation	Double stock	SpaceInvader racks
Double-stack	In the trailer	Throughout the supply chain
Loading (manual versus machine)	Partially manual *(beams need to be set for each row)*	Machine *(double-stacking prepared at dock)*
Can be used on all types of trailers	no	yes
Total handling time	Depends on operational setup, with marginal difference. Time spent differs with operational setup and supply chain	
Can be used in curtain-side trailers (side loading)	no	yes
Double-stack handling	Double fork	Single fork
Ideal for part-loads or partial trailer cargo area	no	yes
Ideal for full-loads (uniform goods)	yes	No, but can be used where double stock isn't possible
Requires arrangement of height on goods loaded across trailer	yes	no
Longitudinal partitions (fx. climate-controlled zones)	no	yes
Can be double-stacked/prepared at terminal dock	no	Ja *(optimising floor space)*
Can be adjusted to all freight heights	yes	yes
Requires handling of return equipment	no	Yes *(proces implemented in pilot phase or handled by transport partner)*
Double-stacked pallet freight can be moved to new truck without needing to be re-stacked.	no	yes

Climate and environment

Type of capacity optimisation	Double stock	SpaceInvader racks
Climate calculation for supplier available	N/A	yes
CO2 savings calculation and documentation through use of solution is available	N/A	yes
Positive environmental effect through CO2/NoX savings	N/A	10-30% reduction in CO2/NoX
Produced from reused materials	N/A	Yes *(racks are produced in reusable aluminium)*
Solution is part of circular business model	no	Yes *(manufacture and use is part of closed-loop system)*
Environmental benefits of business model	N/A	Yes *(is sold as service/rental, which increases capacity utilisation)* • Returned racks are recirculated to new clients • Damaged racks are repaired • Defective parts that cannot be repaired are used to reproduce aluminium